



Straight Path Communications, Inc.
600 Sylvan Ave. Suite 402
Englewood Cliffs, NJ 07632

February 28, 2017

VIA ELECTRONIC FILING

Ms. Marlene H. Dortch
Secretary
Federal Communications Commission
445 12th Street, SW
Washington, DC 20554

Re: Written *Ex Parte* Presentation

GN Docket No. 14-177: Use of Spectrum Bands Above 24 GHz for Mobile Radio Services

Dear Ms. Dortch:

In its recent *ex parte* letter,^{1/} EchoStar Satellite Operating Corporation and Hughes Network Systems, LLC (collectively, “EchoStar”) propose that the Commission increase the Power Flux Density (“PFD”) limit in the 39 GHz band for Fixed Satellite Services (“FSS”) from -117 dBW/m²/MHz to -108 ~ -105 dBW/m²/MHz in different regions in the United States. For the reasons below, the Commission should reject this request.

An Increased PFD Limit Will Cause an Unacceptable Rise Over the Noise Floor

As we illustrated in our previous filing,^{2/} the current PFD limit of -117 dBW/m²/MHz will cause up to a 0.2 dB rise over the noise floor at fifth generation (“5G”) mobile station (“MS”) receivers and up to a 2 dB rise over the noise floor at 5G base station (“BS”) receivers, without considering reflection of the FSS interference. More importantly, the travelling direction of the FSS downlink transmissions is unpredictable due to reflection off manmade structures. When reflections are taken into account, satellite interference with a PFD limit of -117 dBW/m²/MHz can cause up to a 3.5 dB rise over the noise floor at 5G BS receivers. If the PFD limit is further raised to -105 dBW/m²/MHz, satellite interference can cause up to a 13 dB rise over the noise floor at 5G BS receivers.

^{1/} See Letter of Jennifer A. Manner, Senior Vice President of Echostar Corporation, to Marlene H. Dortch, Secretary of FCC, GN Docket No. 14-177 *et al.* (filed Feb. 14, 2017) (“EchoStar Ex Parte Letter”).

^{2/} See Letter of Davidi Jonas, President and CEO of Straight Path Communications, to Marlene H. Dortch, Secretary of FCC (filed Dec. 20, 2016).

In other words, an FSS system operating at the current PFD limit of $-117 \text{ dBW/m}^2/\text{MHz}$ will already cause non-negligible performance degradation to 5G systems. For example, a 2 dB rise of the noise floor at a 5G base station receiver will reduce the uplink coverage area by 20% (for a propagation path loss exponent of 4.0) to 37% (for a propagation path loss exponent of 2.0); a 3.5 dB rise over the noise floor at a 5G BS receiver will reduce the uplink coverage area of the 5G base station by 33% (for a propagation path loss exponent of 4.0) to 55% (for a propagation path loss exponent of 2.0). These degradations will cause billions of dollars in increased build out costs for 5G service providers. A further increase of the PFD limit by 12 dB will defeat the purpose of making the 39 GHz band available for 5G fixed and mobile broadband services. EchoStar proposed to raise the PFD limit to $-108 \sim -105 \text{ dBW/m}^2/\text{MHz}$ depending on the region. This proposal is not materially different from the proposal to raise the current PFD limit by 12 dB and will likely cause similar levels of damage to the 5G systems that are soon to be deployed in this band.

An Increase in the PFD Limit is an Unacceptable Way to Address Rain Fade

EchoStar further claims that “modern satellite systems would limit any increase in power to coverage areas that are actually experiencing a rain fade event.” From terrestrial operators’ perspective, what is important is the FSS PFD on earth, which must remain below $-117 \text{ dBW/m}^2/\text{MHz}$. If the satellite operators can compensate for rain fade in exactly the areas that are affected by rain fade, they should accept the current PFD limit of $-117 \text{ dBW/m}^2/\text{MHz}$ *on the surface of earth*. In contrast, it is unacceptable for satellite operators to increase the satellite transmission power for the purpose of compensating the link budget loss experienced by a handful of FSS earth stations while interfering with millions of 5G subscribers. 5G users should not suffer because of satellite operators’ inability to “limit any increase in power to coverage areas that are actually experiencing a rain fade event.”

The PFD limit of $-117 \text{ dBW/m}^2/\text{MHz}$ is already sufficient for FSS downlink communication. For example, for an earth station with a 1-meter dish antenna (which results in about 50 dB antenna gain at 39 GHz), this PFD limit translates into a signal-to-noise ratio (“SNR”) of more than 20 dB. Further increasing the PFD limit will only result in limited increase of throughput for FSS. In contrast, the loss of throughput and coverage will be significant for millions of 5G subscribers within the large area covered by the satellite beams. The Commission should reject such a request. Instead, satellite operators should invest in technology development and deploy “modern satellite systems” that can actually “limit any increase in power to coverage areas that are actually experiencing a rain fade event.” In that case, satellite operators should be able to operate within the current ground PFD limit of $-117 \text{ dBW/m}^2/\text{MHz}$.

The Satellite Industry Has Other Options

It is difficult for widely deployed terrestrial services and widely deployed satellite services to coexist in the same band. The Commission made the right decision to limit FSS use

of the 37.5 – 40 GHz band to individually licensed earth stations.^{3/} Moreover, the Commission has already made significant accommodations for FSS in the 37/39 GHz band in the Report and Order in this proceeding.^{4/} In addition, FSS maintains its primary designation in the 40 – 42 GHz band. The satellite industry should focus on putting that band – which has been laying fallow for more than a decade – to productive use first before asking for greater rights in the 37/39 GHz band that could jeopardize the performance and economic viability of 5G.

An Increased PFD Limit is Inconsistent with Terrestrial Border Power Limits

Finally, we note that the co-channel interference limit for 5G services in the 37–40 GHz band is -77.6 dBm/m²/MHz (equivalent to -107.6 dBW/m²/MHz) at the geographic license area border. In other words, the Commission’s rules require that a terrestrial operator can only create interference at PFD level of -107.6 dBW/m²/MHz at the license area border. EchoStar’s proposed PFD limit of -108 – -105 dBW/m²/MHz will create stronger interference over *all* 5G deployment in the *entire* country in this band. This will unacceptably degrade terrestrial services, undermining the purpose of this proceeding.

* * *

Pursuant to Section 1.106 of the Commission’s rules, a copy of this letter has been filed in the record of the above referenced proceeding.

Respectfully submitted,

/s/ Davidi Jonas

Davidi Jonas, President and CEO
Jerry Pi, Chief Technology Officer

STRAIGHT PATH COMMUNICATIONS INC.
600 Sylvan Ave. Suite 402
Englewood Cliffs, NJ 07632

^{3/} See 47 C.F.R. §25.202(a)(1) (“Use of [the 37.5 – 40 GHz] band by the Fixed-Satellite Service is limited to individually licensed earth stations. Satellite earth station facilities in this band may not be ubiquitously deployed and may not be used to serve individual consumers.”)

^{4/} See *In the Matter of Use of Spectrum Bands Above 24 GHz for Mobile Radio Services*, Report and Order and Further Notice of Proposed Rulemaking, GN Docket No. 14-177 *et al.*, (rel. July 14, 2016).